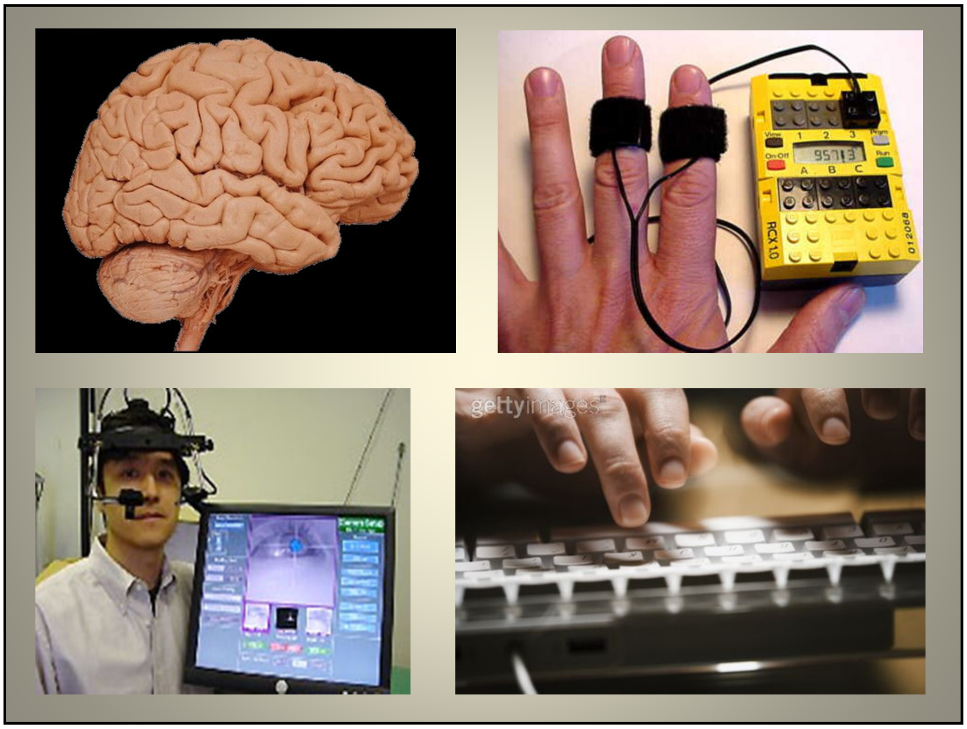
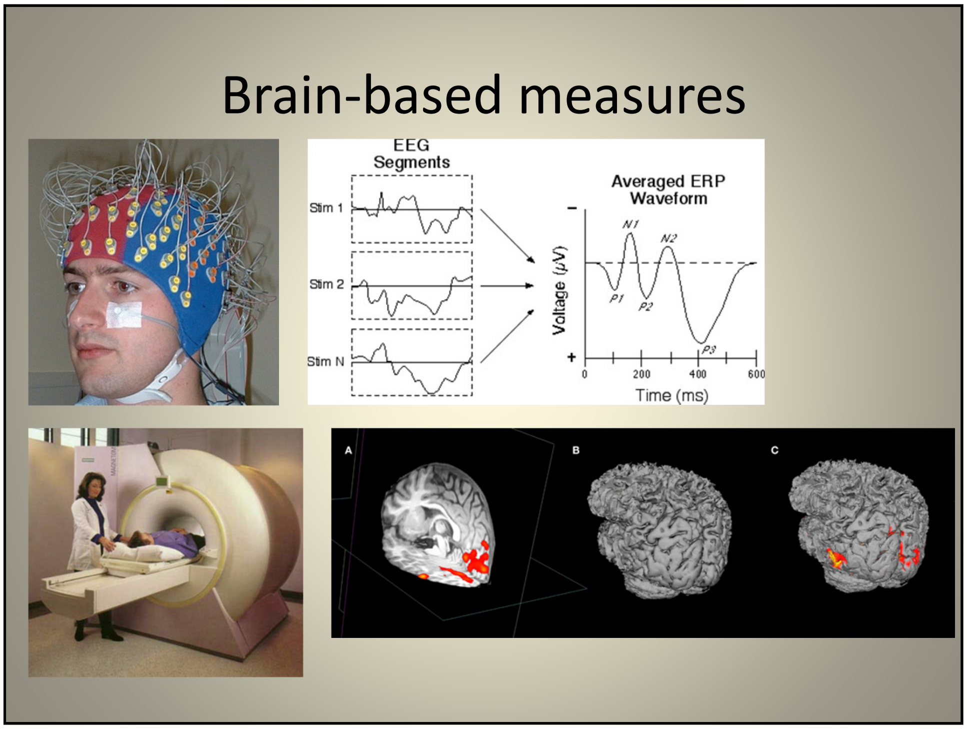
How to study learning and memory

Psychology 248

Prof. Benjamin





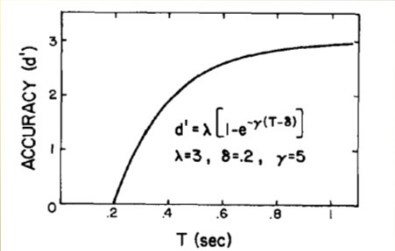
Brain-based measures

EEG Segments
Stim 1
Stim 2
Stim N
Averaged ERP Waveform
-
+
N1
N2
P1
P2
P3
Voltage (μV)
0
200
400
600
Time (ms)
A
B
C

Voluntary behavioral responses

- Typing
- Speaking

Speed versus accuracy



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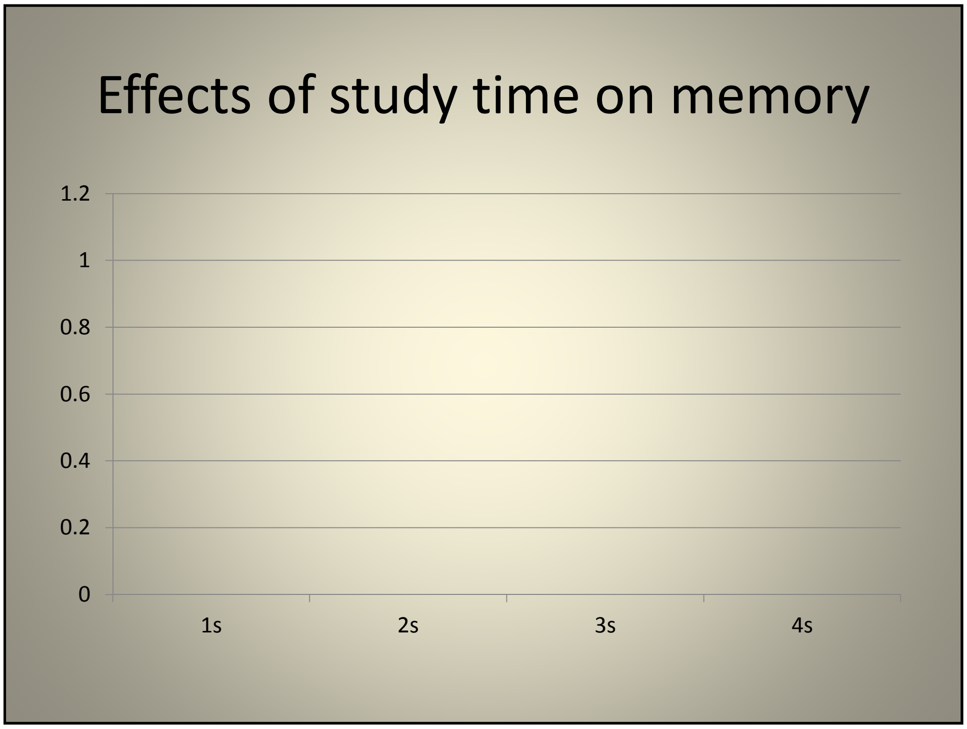
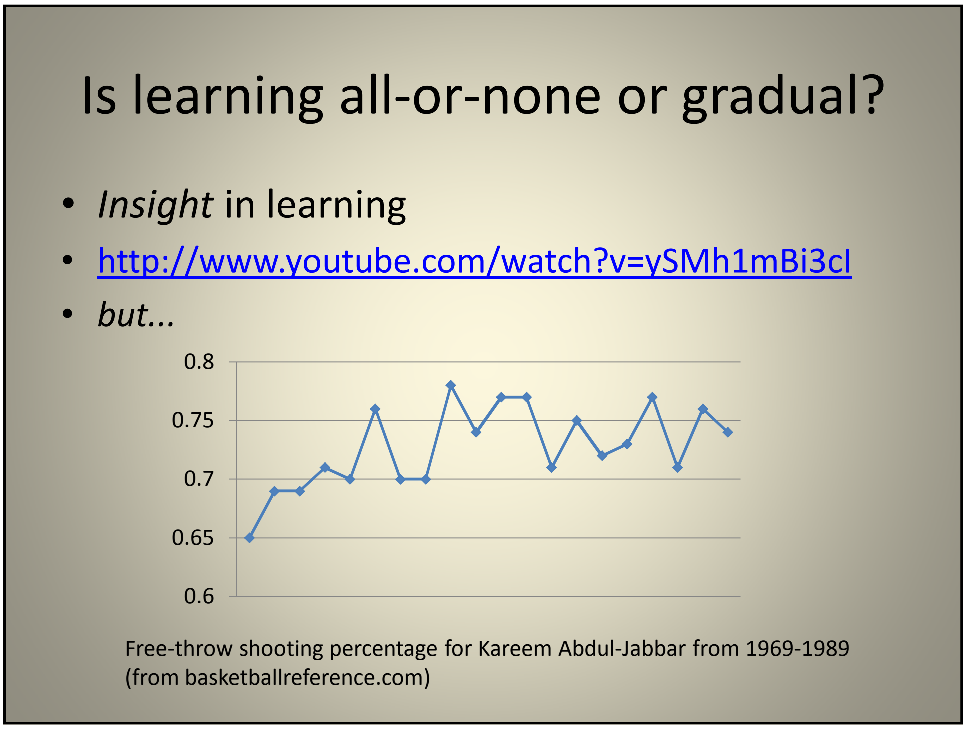
encoding	storage	retrieval
Number of repetitions Study time What to study (word frequency) What to do during study (levels of processing) Who is studying it? Incidental vs. intentional Mental imagery Generation vs. reading Survival processing	Interfering activity Sleep How long before test?	Type of test Cues at test Match with encoding How much time to retrieve? Who is remembering it?



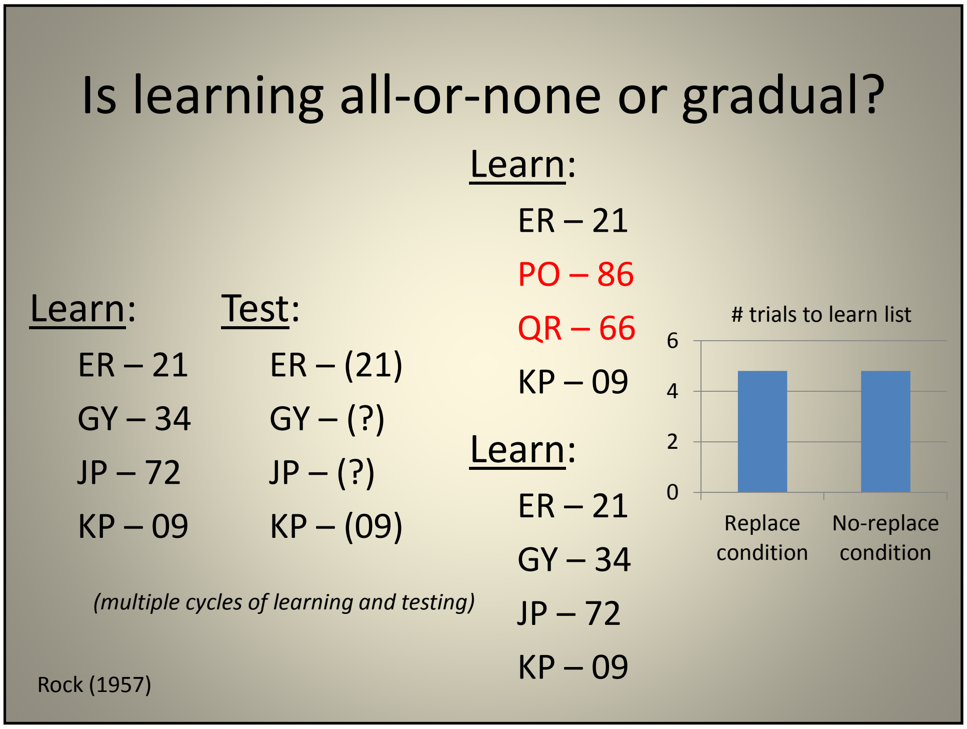
Effects of study time on memory



Is learning all-or-none or gradual?

- *Insight* in learning
- http://www.youtube.com/watch?v=ySMh1mBi3cI
- *but...*

Free-throw shooting percentage for Kareem Abdul-Jabbar from 1969-1989 (from basketballreference.com)



Is learning all-or-none or gradual?

Learn:	Test:
ER – 21	ER – (21)
GY – 34	GY – (?)
JP – 72	JP – (?)
KP – 09	KP – (09)

(multiple cycles of learning and testing)

Learn:

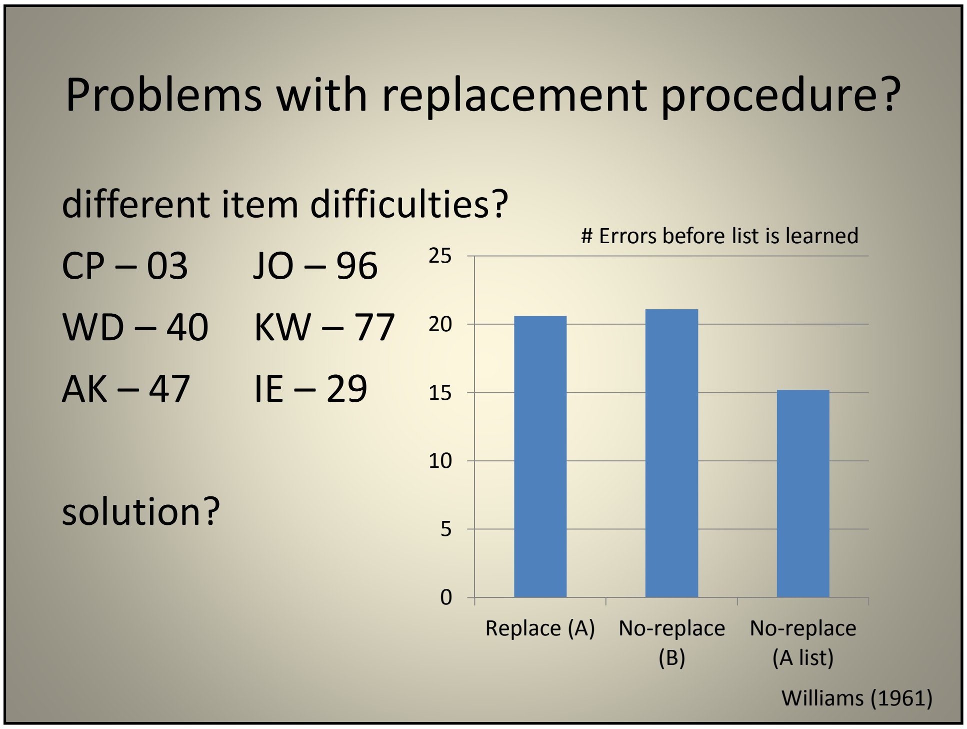
ER – 21
PO – 86
QR – 66
KP – 09

Learn:

ER – 21
GY – 34
JP – 72
KP – 09

# trials to learn list
6
4
2
0
Replace condition
No-replace condition

Rock (1957)



Problems with replacement procedure?

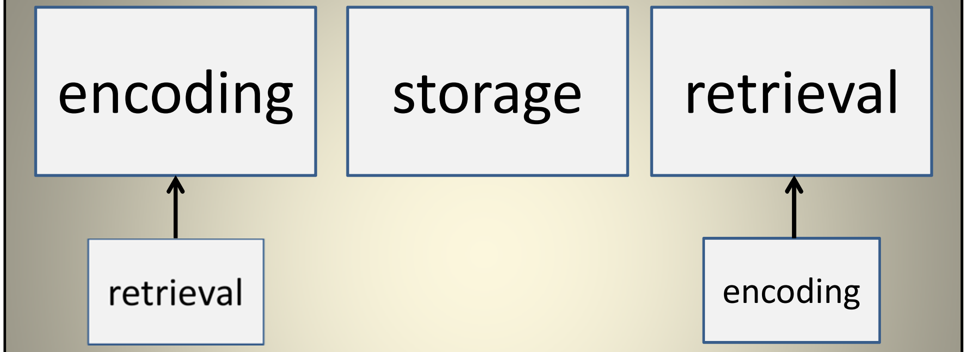
different item difficulties?

CP – 03	JO – 96
WD – 40	KW – 77
AK – 47	IE – 29

solution?

# Errors before list is learned
25
20
15
10
5
0
Replace (A)
No-replace (B)
No-replace (A list)

Williams (1961)



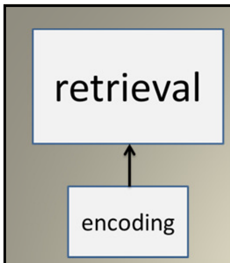
encoding

storage

retrieval

retrieval

encoding



retrieval

encoding

The testing effect

Roediger & Karpicke (2006)

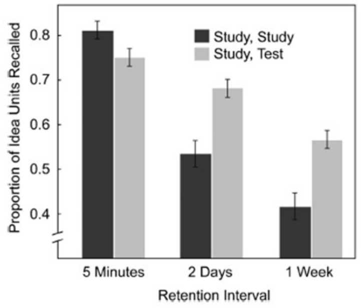


Fig. 6. Mean proportion of idea units recalled from a prose passage after a 5-min, 2-day, or 1-week retention interval as a function of whether subjects studied the passages twice or studied them once before taking an initial test. Error bars represent standard errors of the means. From Roediger and Karpicke (2006).

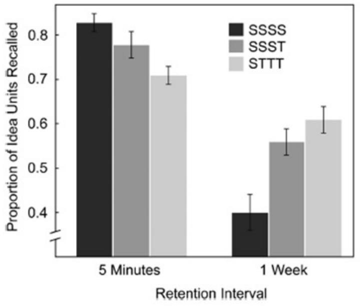
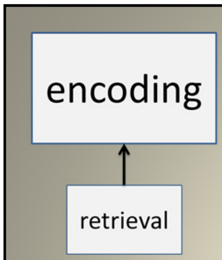
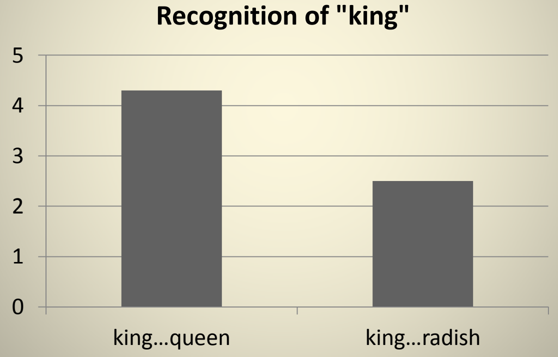


Fig. 7. Mean proportion of idea units recalled on a final test 5 min or 1 week after learning as a function of learning condition. The shorthand condition labels indicate the order of study (S) and test (T) periods. Error bars represent standard errors of the means. From Roediger and Karpicke (2006).



The reminding effect



Tullis & Benjamin (2010)

Recall and recognition

Free recall

Cued recall

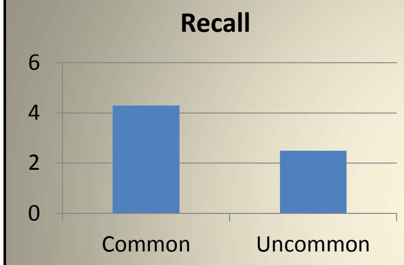
Study: tractor - yellow
Test: tractor - ?

Recognition

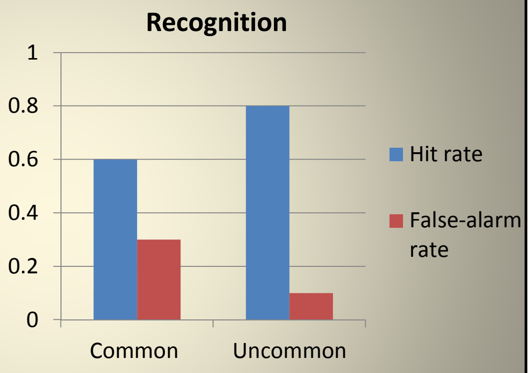
Study: boat
will
Test: will
daisy
charm
boat

Word-frequency “paradox”

Recall



Recognition



Collaborative inhibition

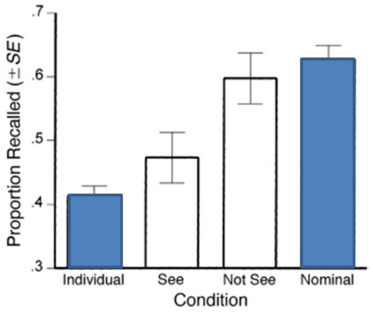


Figure 1. The mean number of items recalled by individuals and by participants in the *see* and the *not see* conditions and the estimates for nominal groups based on the participants who recalled individually. Bars represent standard errors.

Wright & Klumpp (2004)

Subject 1 recalls:
cow
house
train
kite

Individual recall = 4 for both subjects

Nominal group recall = 6

Subject 2 recalls:
cow
magazine
water
kite

Indirect (implicit) memory tasks

- Rapid perceptual identification
- Word-fragment or word-stem completion
- Lexical decision
- Category fluency

Next class:
Classical conditioning